

IN THE CLAIMS

Claims 1 – 13. (Cancelled)

14. (Currently Amended) A gas sampling system for measuring particulate matter in an exhaust gas stream of an internal combustion engine comprising:

a partial flow dilution tunnel connected to the exhaust gas stream of the engine;

a first mass flow controller operatively connected an inlet of said partial flow dilution tunnel;

a second mass flow controller connected to an outlet end of said partial flow dilution tunnel;

a filter interposed said second mass flow controller and the outlet end of said partial flow dilution tunnel; and

a transient dilution air control arrangement being interposed the first mass flow controller and the inlet of said partial flow dilution tunnel, said transient dilution air control arrangement includes a constant mass flow stream and a variable mass flow stream non-collinearly connected with said constant mass flow stream prior to the inlet of the partial flow dilution tunnel for controlling a dilution air supply to said partial flow dilution tunnel.

15. (Original) The gas sampling system of claim 14, wherein said second mass flow controller is a master controller and the first mass controller is a slave controller.

16. (Original) The gas sampling system of claim 14, wherein said transient dilution air control arrangement is positioned in close proximity to said partial flow dilution tunnel.

17. (Original) The gas sampling system of claim 14, including a sampling probe being positioned in the exhaust gas stream and the partial flow dilution tunnel.

18. (Original) The gas sampling system of claim 14, including a supply of scrubbed and filtered air being connected to said first mass controller.

19. (Previously Presented) The gas sampling system of claim 14, including a flow measuring device adapted to measure a flow of intake air, said flow measuring device being positioned in a conduit of an air intake of the engine.

20. (Previously Presented) The gas sampling system of claim 19, wherein said flow measuring device being a laminar flow element is connected to a pressure differential transducer.

21. (Original) The gas sampling system of claim 20, wherein said pressure differential transducer is connected to a selectable gain circuit.

22. (Original) The gas sampling system of claim 21, wherein said selectable gain circuit is switchable to handle one of a single channel input and a multiple channel input.

23. (Original) The gas sampling system of claim 21, wherein said selectable gain circuit is selectable between a plurality of course settings.

24. (Original) The gas sampling system of claim 14, including a vacuum pump connected to said second mass flow controller.

25. (Previously Presented) The gas sampling system of claim 14, including a solenoid valve connected in parallel with the partial flow dilution tunnel between said first mass flow controller and said partial flow dilution tunnel inlet and said partial flow dilution tunnel outlet and said second mass flow controller.

26. (Cancelled)

27. (Previously Presented) The gas sampling system of claim 14, wherein said constant mass flow stream includes a pressure regulating valve serially connected with a critical flow venturi.

28. (Previously Presented) The gas sampling system of claim 14, wherein said variable mass flow stream is connected in parallel with said constant mass flow stream.

29. (Previously Presented) The gas sampling system of claim 14, wherein said variable mass flow stream includes a first pressure regulating valve serially connected with a dome loaded regulating valve and a mass flow transducer.

30. (Original) The gas sampling system of claim 29, including a pressure regulating valve serially connected to a voltage to pressure controller.

31. (Previously Presented) The gas sampling system of claim 30, wherein said voltage to pressure controller is connected to and receives electrical inputs from a flow measuring device and said mass flow transducer, said flow measuring device being adapted to measure a flow of intake air to the engine.

32. (Original) The gas sampling system of claim 31, wherein said voltage to pressure controller is connected to and sends pressure signals to said dome loaded pressure regulating valve.

33. (Currently Amended) The gas sampling system of claim 32, wherein an output from said dome loaded pressure regulating valve and ~~said~~ a critical flow venturi and supply dilution air to said partial flow dilution tunnel.

34. (Currently Amended) A gas sampling system for measuring particulate matter in an exhaust gas stream of an internal combustion engine comprising:

a partial flow dilution tunnel connected to the exhaust gas stream of the engine;

a first mass flow controller operatively connected an inlet of said partial flow dilution tunnel;

a second mass flow controller connected to an outlet end of said partial flow dilution tunnel;

a filter interposed said second mass flow controller and the outlet end of said partial flow dilution tunnel; and

means for controlling dilution air to said partial flow dilution tunnel, said means being interposed the first mass flow controller and the inlet of said partial flow dilution tunnel, said means includes a constant mass flow stream and a variable mass flow stream non-collinearly connected with said constant mass flow stream prior to the inlet of the partial flow dilution tunnel

35. (Original) The gas sampling system of claim 34, wherein said second mass flow controller is a master controller and the first mass controller is a slave controller.

36. (Original) The gas sampling system of claim 34, including a sampling probe being positioned in the exhaust gas stream and the partial flow dilution tunnel.

37. (Original) The gas sampling system of claim 36, wherein said sampling probe is a square root extractor.

38. (Original) The gas sampling system of claim 34, including a supply of scrubbed and filtered air being connected to said first mass controller.

39. (Previously Presented) The gas sampling system of claim 34, including a flow measuring device connected to said means for controlling dilution air, said flow measuring device being adapted to measure a flow of intake air, said flow measuring device being positioned in a conduit of an air intake of the engine.

40. (Original) The gas sampling system of claim 39, wherein said flow measuring device is a laminar flow element.

41. (Original) The gas sampling system of claim 39, wherein said laminar flow element is connected to a pressure differential transducer.

42. (Original) The gas sampling system of claim 41, wherein said pressure differential transducer is connected to a selectable gain circuit.

43. (Original) The gas sampling system of claim 42, wherein said selectable gain circuit is switchable to handle one of a single channel input and a multiple channel input.

44. (Previously Presented) The gas sampling system of claim 34, wherein said selectable gain circuit includes a selectable gain switch being selectable between a plurality of coarse voltage positions.

45. (Cancelled)

46. (Previously Presented) The gas sampling system of claim 34, wherein said constant mass flow stream includes a pressure regulating valve serially connected with a critical flow venturi.

47. (Previously Presented) The gas sampling system of claim 34, wherein said variable mass flow stream is connected in parallel with said constant mass flow stream.

48. (Previously Presented) The gas sampling system of claim 34, wherein said variable mass flow stream includes a first pressure regulating valve serially connected with a dome loaded regulating valve and a mass flow transducer.

49. (Original) The gas sampling system of claim 48, including a pressure regulating valve serially connected to a voltage to pressure controller.

50. (Original) The gas sampling system of claim 48, wherein said voltage to pressure controller is connected to and receives electrical inputs from a flow measuring device and said mass flow transducer, said flow measuring device being adapted to measure the flow of intake air to the engine.

51. (Original) The gas sampling system of claim 50, wherein said voltage to pressure controller is connected to and sends pressure signals to said dome loaded pressure regulating valve.

52. (Currently Amended) The gas sampling system of claim 51, wherein an output from said dome loaded pressure regulating valve and ~~said~~ a critical flow venturi supply dilution air to said partial flow dilution tunnel.